

# **Portsmouth Gaseous Diffusion Plant-Piketon, Ohio**

**Inspection Under the National Emission Standards for  
Emissions of Radionuclides Other Than Radon  
From Department of Energy Facilities  
40 CFR 61, Subpart H  
I. FACILITY IDENTIFICATION**

### **A. Facility Location**

Portsmouth Gaseous Diffusion Plant

3930 U.S. Route 23 South

Piketon, Ohio 45661

### **B. Responsible Official**

#### **USDOE**

E.W. Gillespie, Site Manager

Phone: (614) 897-5010

#### **USEC**

T. Michael Taimi, Environmental Assurance and Policies Manager

Phone: (301) 564-3409

## **II. DATE OF INSPECTION**

July 22 - July 26, 1996

## **III. PARTICIPANTS**

### **A. Facility**

Melda Rafferty, USDOE/PORTS; Kristi Wiehle, USDOE/PORTS; Dean Roberts, LMES; Dick Snyder, LMES; Robert Blythe, LMUS; Mary Young, USEC; Tony Saraceno, LMUS; Larry Zonner, LMUS; William Gundlah, LMUS; Jason Patrick, LMUS; Wayne Spetnagel, LMUS; Carol Van Meter, LMUS; James Litteral, LMUS; David Richter, LMUS; Charles Good, LMUS; James Williams, LMUS; Greg Fout, LMUS; Roger McDurnet, LMUS.

### **B. USEPA**

Michael H. Murphy, USEPA Region 5; Eugene Jablonowski, USEPA Region 5; Charles Phillips, SC&A, Contractor for USEPA

### **C. State of Ohio**

Steve Alspach, OEPA, SEDO; Dan Thompson, OEPA, CDO; Stacey Coburn, CDO; William Lohner, OEPA, OFFO; Frank Talbot, ODH/BRP; Celeste Lipp, ODH/BRP.

## **IV. ACRONYMS AND ABBREVIATIONS USED IN THIS REPORT**

**ANSI**-- American National Standards Institute

**APC**-- Air Pollution Control

**BE**-- Building exhaust

**BRP**-- Bureau of Radiation Protection

**CDO**-- Central District Office

**CFR**-- Code of Federal Regulations

**cpm**-- Counts per minute

**DAPC**-- Dayton Air Pollution Control or Division of Air Pollution Control

**DMR**-- Discharge Monitoring Report

**DQO**-- Data Quality Objective

**EML**-- Environmental Measurements Laboratory

**EMSL-LV**-- Environmental Monitoring Systems Laboratory at Las Vegas

**FFCA**-- Federal Facility Compliance Agreement

**g**-- Grams

**Ge(Li)**-- Germanium Lithium detection probe

**HASA**-- High Assay Sampling Area

**KeV**-- Kilo electron volts (1000 electron volts)

**LMES**-- Lockheed Martin Energy Systems (formerly MMES)

**LMUS**-- Lockheed Martin Utility Services (formerly MMUS)

**m**-- Micrometer, Micron (0.000001 meter)

**MDL**-- Minimum detection Limit

**MMES**-- Martin Marietta Energy Systems

**MMUS**-- Martin Marietta Utility Systems

**N/A**-- Not Applicable or Not Available

**NAREL**-- National Air and Radiation Environmental Laboratory

**NESHAP**-- National Emission Standard for Hazardous Air Pollutants

**NOAA**-- National Oceanographic and Atmospheric Administration

**ODH**-- Ohio Department of Health  
**OEPA**-- Ohio Environmental Protection Agency  
**OFFO**-- Office of Federal Facility Oversight  
**PAT**-- Proficiency Analysis Testing Program  
**PET**-- Proficiency Environmental Testing Program  
**PORTS**-- Portsmouth Gaseous Diffusion Plant  
**QA**-- Quality Assurance  
**QAPjP**-- Quality Assurance Project Plan  
**QC**-- Quality Control  
**SC&A**-- Sanford Cohen and Associates  
**SEDO**-- Southeast District Office  
**SOPs**-- Standard Operating Procedures  
**Tc-99**-- Technetium-99  
**TRU**-- Transuranic materials  
**U-235**-- Uranium-235  
**USDOE**-- United States Department of Energy  
**USEC**-- United States Enrichment Corporation  
**USEPA**-- United States Environmental Protection Agency  
**WP**-- Water Pollution Performance Evaluation Study

## **V. OBJECTIVE/SCOPE OF INSPECTION**

The objective of this inspection is to provide a follow-up to the baseline evaluation by the USEPA for compliance with the radionuclide NESHAP, 40 CFR 61, Subpart H of March 16-19, 1993. The inspection is intended to ascertain whether the Portsmouth Gaseous Diffusion Plant is still meeting the Findings of the previous Inspection. The Findings of this Inspection will determine the necessity of negotiating a Federal Facility Compliance Agreement (FFCA). This inspection will cover similar areas and should be of the same depth as the baseline inspection.

The scope of the inspection is to 1) perform a walk-through survey to observe all of the locations that are, have been, or are currently suspected of being emission points on site to determine compliance with the monitoring requirements of the regulation, and 2) examine documents on dose modeling and compliance with other record keeping requirements of the rule.

## VI. FACILITY DESCRIPTION

The following site description is taken from the Calendar Year 1995 annual report submitted to the USEPA on June 24, 1996.

The Portsmouth Gaseous Diffusion Plant (PORTS) is owned by the Department of Energy (DOE). PORTS was operated by DOE and managed by Martin Marietta Energy Systems, Inc., until July 1, 1993. In 1992 Congress passed legislation amending the Atomic Energy Act of 1954 to create the United States Enrichment Corporation (USEC). A government corporation similar to the Tennessee Valley Authority, to operate the uranium enrichment enterprise in the United States. The new corporation began operation on July 1, 1993. In accordance with the Act, USEC leased all production facilities at PORTS and its sister plant at Paducah, Kentucky, from DOE. DOE retained operational control of all waste storage and handling facilities as well as all sites undergoing environmental restoration.

The PORTS site is located in sparsely populated, rural Pike County, Ohio, on a 16.2-km (6.3-mile) site about 1.6 km (1 mile) east of the Scioto River Valley at an elevation of approximately 36.6 m (120 ft) above the Scioto River floodplain. The terrain surrounding the plant, except for the Scioto River floodplain, consists of marginal farmland and densely forested hills. The Scioto River floodplain is farmed extensively, particularly with grain crops.

Pike County has a generally moderate climate. Winters in Pike County are moderately cold, and summers are moderately warm and humid. The precipitation is usually well distributed with fall being the driest season. Prevailing winds at the site are out of the southwest to south. Average wind speeds are about 5 mph (8 km/h) although winds of up to 75 mph (120 km/h) have been recorded at the plantsite. Usually high winds are associated with thunderstorms that occur in spring and summer. Southern Ohio is within the midwestern tornado belt although no tornados have struck the plantsite to date.

Pike County has approximately 23,000 resident. Scattered rural development is typical; however, the county contains numerous small villages such as Piketon, Wakefield, and Jasper, which lie within a few kilometers of the plant. The county's largest community, Waverly, is about 19 km (12 miles) north of the plantsite and has a population of approximately 5,100 residents. Additional population centers within 80 km (50 miles) of the plant are Portsmouth (population 25,500), Chillicothe (population 23,420), and Jackson (population 6,675). The total population of the area lying within an 80-km (50-mile) radius of the plant is approximately 600,000.

USEC is responsible for the principal site process and support operations. The principal site process is the separation of uranium isotopes through gaseous diffusion. Support operations include the feed and withdrawal of material from the primary process, treatment of water for both potable and cooling purposes, steam generation for heating purposes, decontamination of equipment removed from the process for maintenance or replacement, recovery of uranium from various waste materials, and treatment of industrial wastes generated onsite. DOE is responsible for the decontamination activities in the X-326 building, X-326 "L-Cage" and its glovebox, X-345 high assay sampling area (HASA), X-744G glovebox and site remediation activities. The emissions from the DOE sources listed in this report represent 13% of the air emissions from the USEC Source one (X-326 Top Purge, Side Purge and E-jet vents), 13% of the emissions from the

Seal Exhaust (SE) 6 (which is part of USEC Source two), and all of the emissions from DOE sources one (X-326 SE 5 Vent) and two (X-345 HASA).

## **VII. INSPECTION FINDINGS**

An Inspection of the Portsmouth Gaseous Diffusion Plant (PORTS) was conducted on July 22 through July 26, 1996. The Inspection team was comprised of staff from USEPA, SC&A under contract to USEPA, OEPA, and ODH. As most of the production facilities are currently under the operation of USEC and LMUS, the USDOE and LMES played only a minor role in this inspection. A general overview and observations are included in the General Findings heading, with the specific issues to be addressed listed under Specific Findings along with recommendations to address these issues.

### **GENERAL FINDINGS**

The inspection found that the staff of the Portsmouth Gaseous Diffusion Plant were cooperative and receptive to all requests for information for the evaluation of the facility compliance status. Generally, the program appears to be well run and documented, with the personnel being competent and sincere in their desire to meet the requirements of the radionuclide NESHAPs regulations.

There were, however, some areas that need some additional improvements or better documentation to better meet the needs of the regulation. Additionally, There were two areas in the sampling systems that need to be addressed to bring them into conformity with the other sampling systems in the facility.

1) Since the baseline inspection in 1993, there has been considerable improvement in the sampling systems at PORTS. 2) Personnel were competent and were observed to have a good understanding of the principals that were required for successful performance of their duties. They were also very open and responsive to inquiries during the inspection. 3) The Quality Assurance Plan was relatively comprehensive, though it did lack sufficient detail in some areas. The laboratory staff had a good knowledge of the procedures and adhered to the SOPs. 4) Laboratory instrument calibrations appeared to have been performed adequately and in a timely manner. The standard preparations were well documented and traceable. Chemical standards were appropriately labeled and dated.

During the inspection verification of the HASA facility in the X-345 building was conducted. The HASA equipment has been locked out and is in the process of being decontaminated. Photographic documentation of this is to be provided by USDOE and LMES. This facility is not expected to be operational at any time in the future.

### **SPECIFIC FINDINGS**

#### **SAMPLING SYSTEMS:**

1) On the X-344 Gulper System, the flanges were cracked, allowing the possibility of an unmonitored release of radionuclides. The fastenings were inappropriate for the area. Masking tape and bolts that have a single nut holding them on the system need to be re-evaluated. It would

be more usual to find the nuts locked in place with a second nut or a sealing material. This should also preclude the necessity of any type of tape or adhesive sealing on the flanges. It would also be recommended that there be a regular, documented checking of the flange conditions at this location and any other location where similar situations may arise.

2) In the X-326 building, the Top, Side and E-Jet samplers need to be reconfigured to conform with the other sampling systems. A portion of the current system has lines that are excessive in length as well as an excessive number of bends. This could be easily remedied by the removal of this portion of the system and consolidating the sampling system into individual units, as the other systems have in place currently.

#### DOCUMENTATION:

1) During the investigation, the use of an unmodified, in-house developed computer spreadsheet program for calculating Tc-99 concentrations using liquid scintillation counting data, became an issue. Upon interviews with laboratory personnel, it came to light that a change in the method used to calculate Tc-99 concentrations from raw data generated by liquid scintillation counters had occurred. Of the three computers used to calculate the Tc-99 values, at least one computer system was not updated. It is unclear the exact number of incorrectly calculated values for Tc-99 that are currently assumed to be correct. The PORTS laboratory should determine and report to the Region 5 office the numbers of incorrectly calculated Tc-99 values. Additionally, a table should be prepared listing the incorrect values along with the correct values. The Region 5 office should then be apprised of the potential impact(s) of the issue.

2) The spreadsheet calculations for the Tc-99 did not include MDA values. The actual MDAs are likely below the reporting limit; however, there is no way to verify this if the MDAs are not calculated. To remedy this situation, the MDAs should be included in the calculations for the Tc-99 data.

3) It was noted that in the Data Package Review Checklist for batch #9607099936 (U-235) was not signed or apparently reviewed by the supervisor. This signature is required by the laboratory Quality Assurance Plan. It was further noted that the Data Package Review Checklist for batch 96070448 (U-235) was left totally blank, aside from the batch number. This data package was apparently not reviewed, though the package contained all of the information that is required. From these two separate examples, it appears that the procedures for verification of completeness needs to be addressed. It would also be advisable to do a more thorough audit to ascertain how frequently this issue has occurred as well as its potential impact on the data provided.

4) Uranium and Technetium release data are hand calculated from the data reported in the AnaLis system and from data recorded from the vent samplers. While these hand calculations are verified by a second individual, there would be less probability of an error if they were performed by a validated computer software (i.e. spreadsheet).

5) There is no indication on the vent sampler log sheets of the trap numbers which are put in place. Some of the entries on these log sheets were marked through, voided, without being initialed and dated.

#### OTHER OBSERVATIONS/ISSUES

- 1) Gloves were disposed of in a waste receptacle that had a sign stating that it was for sanitary waste only. Procedures for disposal of specific items should be specified more clearly.
- 2) SOPs for software validation needs to be generated for any on site software that may be used for compliance purposes.
- 3) Documentation for the abandoned sampling ports on the sampling systems in the X333 building needs to be provided. These additional ports could potentially cause additional turbulence that could affect the representativeness of the sample collected.
- 4) A log for the sample shaker to provide data on the actual time of mixing for the alumina is suggested. This would provide documentation at to the mixing and the time of mixing prior to the further sample preparation.
- 5) While the calibration data was available for the ambient monitors in documentation kept at the facility, it would be suggested that calibration stickers be placed on the instruments also. Additionally, any line rinsate analysis for the ambient monitors should also be included in the data analyzed for diffuse emissions.
- 6) An annual composite analysis of the secondary traps for TRU materials would be suggested. This would provide additional data about potential radionuclide emissions from past reprocessing activities.

Comment: All findings have been appropriately addressed to date by USDOE and/or USEC, depending upon the specific finding and the responsible entity.